COMP3506/COMP7505—Algorithms and Data Structures

School of Information Technology and Electrical Engineering

Week 13 Tutorial

Question 1

Create a graph that has 10 vertices labelled 1 to 10. Add 10 undirected edges between randomly chosen pairs of vertices—label them ‘A’ to ‘J’. For each edge also give it a weight randomly chosen between 1 and 10.

Answer the following:

a. Is the graph connected?

b. What is the degree of vertex 10?

c. Is the graph dense or sparse?

Question 2

This question uses the graph from question 1.

List the labels of vertices in the order they are ‘visited’ using

a. depth-first traversal

b. breadth-first traversal

Question 3

This question also uses the graph from question 1.

Pick a vertex and find the shortest path to every other node using Dijkstra's algorithm. Represent each path as follows:

(i) → (j) = (i), [e_1], (v_1), [e_2], (j); where (i) represents a node and [i] represents an edge. eg. (1) → (2) = (1), [3], (4), [1], (2).